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By Boris

MAINTAINING MOISTURE CONTENT CONDITIONS DURING LUMBER STORAGE

After lumber has been kiln dried, it is often placed in storage, unstickered, until ready for use. If storage periods are short (up to 1 month) and the storage building is kept closed most of the time, little change in moisture content will occur. However, in many cases dry lumber is stored for several months or longer in buildings not designed to maintain a fixed equilibrium moisture content condition. In some arid regions of the United States, such as Arizona, New Mexico, and southern California, unheated dry storage will hold dried lumber at a low EMC condition. However, in the rest of the country, unheated dry storage will not prevent kiln-dried lumber from gradually increasing in moisture content.

Keeping lumber at a constant EMC condition, using only heat and no steam or moisture supply, is described in the attached article by Ray Rector of Drexel Enterprises, Inc. The article won the S.E. Dry Kiln Club's seasoning award and was published in the Southern Lumberman.

The differential thermostat that Mr. Rector favors can be adjusted to maintain any desired EMC condition. Air at a given temperature and relative humidity condition contains a fixed amount of water vapor, designated its absolute humidity, and expressed in grains per cubic foot. When the temperature of this air is raised and no extra water vapor is introduced, the relative humidity of the air is decreased. As a result, the EMC is lowered. For example, the attached figure shows that air at a temperature of 50° F. and 80 percent relative humidity (an EMC of 16 pct.) holds about 3.5 grains of water. If this air is heated, what temperature needs to be maintained at this absolute humidity to produce a predetermined lower EMC? A glance at the chart indicates that if 9 percent EMC is desired, the temperature must be raised to 65° F.; if 7 percent is desired, the temperature is raised to 75° F.

It can also be seen from this chart that the EMC of wood remains almost constant throughout the range of temperatures shown when a constant relative humidity is maintained. (On the chart, the lines of EMC and relative humidity are almost parallel.) For instance, at 35 percent relative humidity,



the EMC of wood is held at about 7 percent throughout a wide temperature range. For this reason, hygrostats which hold a constant relative humidity condition are also very popular for maintaining the moisture content of wood in storage or in the plant.

Thermostatic and hygrostatic controls are readily available from manufacturers listed in industrial directories.

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For further information on this subject and other areas of forest products utilization, contact your State Forester who cooperates with the U.S. Forest Service in providing direct assistance to forest landowners, loggers, and wood processing firms.

These technical reports are issued by State and Private Forestry. Suggestions for topics for this report can be forwarded to Forest Products Laboratory, P.O. Box 5130, Madison, WI 53705.